In defence of Richness of the Base: context-free weight in Welsh

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The argument

- Is overgeneration a big issue for substance-free phonology?
  - ☞ It depends
- How do we measure overgeneration?
  - ☞ By feeding unexpected inputs to the computation
- But we know that the lexicon is shaped by the phonology over time
  - ☞ So how relevant is Richness of the Base after all?
- We should look at corner cases
- Argument: sometimes only RotB can tell learners that their system is crazy

Richness of the what?

- A fundamental principle of OT: the grammar should map all thinkable inputs to licit outputs
- We cannot rely on input generalizations (i. e. 'this pattern is unattested because there are no words of the relevant form in the lexicon of this language')
- Often put forward as a solution to the 'duplication problem' (for which see e. g. Kenstowicz and Kisseberth 1977)

Opinions on Richness of the Base differ

- 'ROTB is fundamental to the theory and inextricably linked with the results that OT can achieve' (McCarthy 2005)
- '[T]he notion of Richness of the Base is a computational curiosity of OT grammars which is irrelevant to human language' (Hale and Reiss 2008)
- 'The proposed solution involves explicitly implementing Richness of the Base in the initialization of the lexicon [...]. By relying on Richness of the Base [...], the algorithm is able to use negative evidence implicitly to find restrictive grammars' (Jarosz 2006)

What am I talking about?

- Today I focus on mutually predictable distributions
- Stressed syllables in most of North Germanic (forget extrametricality)
  - CV:, CVC
  - *CV, CV:C
- In classic phonemic theory, only one of consonant and vowel length is 'contrastive'
- But a computation can enforce the predictable distribution of anything (all the way to Halle 1959)

The resolution

- The Contrastivist Hypothesis (Dresher, Piggott, and Rice 1994; Hall 2007; Dresher 2009) says that phonological computation operates on entities that are used to distinguish lexical items
- But there can well be redundancy in the lexicon!
- Assume both vowel and consonant length are entities that the North-Germanic-minus-Danish lexicon actually allows
- The mutually predictable distribution must be enforced by the phonology
- We do need computation to weed out [CV] and [CV:C] syllables
- And as OT theorists we do face the Richness of the Base issue

An example I

- In OT, we cannot say that 'X is contrastive and Y is derived', if Y is phonological
- But we can say that 'X is reproduced faithfully and the distribution of Y is only driven by markedness' (cf. Flemming 2005)
- Rice (2006): ranking predicts that CVCCV should surface as CV:CCV
- Seems like a poor prediction: potential for [CV:CCV] words
- Potential diachronic explanation: yes, but since the lexicon has been shaped by the outcomes of the same system, it does not contain disharmonic inputs
- 'Missed generalization', bad
- Here, we're lucky: (very few) relevant disharmonic inputs do exist and they do give the right results, as in *påske*
- Similar example in Friulian (Hualde 1990; Baroni and Vanelli 2000; Iosad 2012):

An example II

- Stressed vowels lengthen before all underlyingly voiced obstruents, always remain short before voiceless ones
- Solution in Iosad (2012) requires /CV:T/ to surface faithfully
- Which it does in a very few words thanks to etymological happenstance

Moral

Richness of the Base is important, but don't be too trigger-happy with 'it overgenerates!'

Dealing with crazy patterns

- I am going to discuss a particularly complicated example from Welsh
- Two alternatives for the analysis
  - Relatively simple computation ⇒ huge holes in the lexicon
  - Satisfying Richness of the Base ⇒ factorial typology pain
- Tentative proposal: at some point learners give up on Richness of the Base and accept lexical holes, which in turn allows seepage of disharmonic inputs

South Welsh

- Data from Awbery (1984, 1986)
- Vowel length only allowed in stressed syllables
- Complicated distribution of vowel length depending on the following consonant
- Three interacting factors: vowel length, consonant length, consonant quality (also vowel quality, but that does seem to be phonetics)
- Contrastive length before single [n l r]
- Consonants following short stressed vowels are lengthened

(1)

a.	['ka·nol]	*canol*	'middle'
b.	['an·er]	*anner*	'heifer'

South Welsh cont'd

- Otherwise, length is fully predictable
- Short before consonant clusters
- Otherwise length is determined by the quality of the following consonant
- Shading means preceding vowel is short

(2) p t k s ʃ ɬ f θ χ b d g v ð m ŋ n l r w j

- Lack of contrast: coerced weight (Morén 2001)
- We know that coerced weight generally follows the sonority hierarchy (Zec 1988, 1995; Morén 2001; de Lacy 2006)

How do we know all of these are phonological?

- Vowel length: minimal pairs in monosyllables (no consonant length contrast described)
- Consonant length: minimal pairs such as those in (1)
  - ☞ Cannot fully derive from vowel length, because that does not always map faithfully

(3)

a.	['peːɬ]	*pell*	'far'
b.	['peɬ·aχ]	*pellach*	'further'

- Consonant quality: obviously phonological, not derivable from length (contrast Carlyle 1988)

The paradox and a possible solution

- The paradox: the distribution of morae is due to a ranking of *μ constraints that always prefers more sonorous segments to be moraic
- But South Welsh seems to require *μ[b d g] ≫ *μ[p t k], which makes no sense
- Similar facts not unknown: Metropolitan New York English (Morén 2001), Limburg dialects (Hermans and van Oostendorp 2005)
- Solution by Morén (2001): DepLink-μ[b d g] ≫ *μ[p t k] ≫ *μ[b d g]
- DepLink is a faithfulness constraint and does not care about sonority

The problem

- DepLink-μ cannot enforce an unfaithful mapping
- Theoretical input /eb$_\mu$ol/ should map to *[ebol] (contrast ['eːbol] 'foal')
- Rich base problem!

Am I being too trigger-happy?

- No: under otherwise reasonable representational assumptions for Welsh, DepLink-μ[b d g] also assigns a violation to [p t k] acquiring a mora
- So it doesn't work anyway

Solution

- Not enough time for the gory details...
- Workable solutions tend to have catastrophic factorial consequences
- One that works: augmentation constraints requiring certain featural configurations to be licensed by morae irrespective of syllable position (call them Have-μ)

☞ Generalize Weight by Position and add a featurally defined argument: should be unobjectionable from the perspective of constraint-schema architecture

- Bad overgeneration: e. g. a language where all segments are moraic

☞ Then again the more conventional solution overgenerates too, so how can you weigh that?

The corner cases

- Native vocabulary too firmly shaped by history to give any clues
- Loanwords from English: many examples of disharmonic monosyllables: ['stroːk] 'stroke', ['led] 'lead'

☞ But these borrowings can be quite egregious (['gaːrd] 'fire guard'), so pending a good account of lexical strata caution is warranted

- Problems with monosyllables:
  - Final consonants: rôle for extrametricality (clearly active in the language)
  - Underived forms: morphology?
- Not at all clear what happens in penultimate syllables where the pattern is most apparent

☞ Orthography suggests reversion to unmarked pattern in at least one case: *gêm* 'game', plural *gemau*

- Further research needed (not helped by the different pattern in North Welsh)

The importance of the rich base I

- I suggest that the seepage of disharmonic borrowings is due to speakers giving up on the system with the bad factorial typology
- Welsh′, without the borrowings, has existed

☞ Older borrowings are normally harmonic

- Learners of Welsh′ were faced with a choice of unappealing alternatives
  - Rule out the disharmonic form in the phonology ⇒ ugly HAVE-μ grammar
  - Assume that all voiceless stops are underlyingly moraic etc. ⇒ hugely redundant lexicon
  - Assume the DEPLINK-μ solution ⇒ gaps in the lexicon (also it might not work anyway)
- The bad things I say about the lexicon are not necessarily bad: it's the debris of phonological change (Kiparsky 1995; Bermúdez-Otero 2007; Bermúdez-Otero and Trousdale, forthcoming)

The importance of the rich base II

- Good consequence for the Contrastivist Hypothesis: you can have phonological objects that are strictly speaking unnecessary to implement contrast ('redundant') but still present in the lexicon, and therefore available to the computation

☞ In fact you expect this sort of redundancy to be there

The rôle of grammar in language change

- Grammatical change that does not appear to be influenced by external considerations such as imperfect learning
- The trade-off: unconstrained grammar vs. unconstrained lexicon (isn't it always?)
- But these questions can only be asked if Richness of the Base issues are something learners attend to
- So: it might not be completely useless after all
- Contribution to a theory of diachrony, important for substance-free phonology because diachrony is another filter for deriving attestable (as opposed to computable) languages
- Bonus: the existence of grammatically driven sound change presupposes a phonological grammar

Diolch yn fawr!

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